

Red Bluff Diversion Dam Actions I.3

Action Suite I.3 Red Bluff Diversion Dam (RBDD) Operations

Objectives: Reduce mortality and delay of adult and juvenile migrations of winter-run, spring-run, CV steelhead, and Southern DPS of green sturgeon caused by the presence of the diversion dam; provide unimpeded upstream and downstream fish passage in the long term by raising the gates year-round; minimize adverse effects of continued dam operations, while pumps are constructed to replace the loss of the diversion structure.

Action I.3.1. Operations after May 14, 2012: Operate RBDD with Gates Out

Action: No later than May 15, 2012, Reclamation shall operate RBDD with gates out all year to allow unimpeded passage for listed anadromous fish. If the Red Bluff Alternative Intake Structure is not anticipated to be operational by May 15, 2012, Reclamation may submit a request to NMFS, no later than January 31, 2012, to close the gates from June 15 to September 1, 2012. This request must document that all milestones for construction of the alternative pumping plant have been met and that all other conservation measures (see below) have been implemented.

Results: Despite some weather-related construction delays this spring, construction of the new pumping plant is currently on schedule.

Recommendations: Continue to constantly monitor construction progress, and be prepared to request any currently unforeseen needed gate operation in 2012 by January.

Action I.3.2. Interim Operations

Action: Until May 14, 2012, Reclamation shall operate RBDD according to the following schedule:

- September 1 – June 14: Gates open. No emergency closure of gates allowed.
- June 15 – August 31: Gates may be closed at Reclamation's discretion, if necessary to deliver water to TCCA.

Results: Reclamation closed the dam gates on June 16, 2011, forming Lake Red Bluff and allowing for gravity diversion of water into the Tehama-Colusa and Corning Canals.

Reclamation began raising the gates September 1, 2011, and the gates were completely out by September 4.

Recommendations: Continue to monitor the new pumping plant construction progress, and ensure the pumping plant is operational by May 2012.

Action I.3.3. Interim Operation for Green Sturgeon

Action: When gates are in, Reclamation shall retain a minimum 18-inch opening under the gates that are open to allow safe downstream passage of adult green sturgeon. The 18-inch opening may be modified to 12 inches by the RBDD technical team if necessary to maintain the structural integrity of the dam and/or adequate attraction flows for salmonids at the fish ladders, or in consideration of other real-time fish migratory issues.

Results: All open gates were maintained at a minimum opening of 18 inches, with the exception of the “regulating” gate number 11 that lowered to between 1.2 and 1.3 feet on August 9, 11, 15, 16, and 17. The Red Bluff Diversion Dam technical team did not convene during the gates in period to discuss alternative gate openings.

Recommendations: Continue to monitor the new pumping plant construction progress, and ensure the pumping plant is operational by May 2012.

Action I.3.4. Measures to Compensate for Adverse Effects of Interim Operations on Green Sturgeon

Action: Reclamation shall continue the ongoing funded research to characterize green sturgeon populations in the upper Sacramento Basin, their movements, and habitat usage. In addition, Reclamation (or TCCA) shall convene a technical team to review studies and results and coordinate research needs for green sturgeon. Reclamation and/or TCCA shall provide the necessary funding to insure that research will continue to be conducted in a coordinated and cooperative manner with the express intent of fully implementing the research projects described in the UCD proposal in Appendix 2-B to this Opinion.

Results: The research consists of 1) genetic evaluation of the green sturgeon spawning population in the Sacramento River; 2) telemetric studies of adult green sturgeon movements; 3) characterization of green sturgeon spawning habitat in the Sacramento River; 4) telemetric studies of juvenile green sturgeon movements and identification of rearing habitat; 5) spawning of wild-caught green sturgeon and rearing of juveniles for telemetric and laboratory studies; and 6) evaluation of fish screen performance and alternative fish exclusion technologies.

Reclamation entered into a new three-year cooperative agreement with U.C. Davis to accomplish the RPA-prescribed green sturgeon studies, along with other cooperators. This fiscal year, Reclamation funded the remaining two years of the agreement. Following is a brief provisional summary of study activities during water year 2011.

About 900 green sturgeon larval samples were collected for genetic evaluation. Genotypes will be created from these samples and estimates of 2010 and 2011 spawner contributions will be completed in 2012.

The study area for the adult green sturgeon movement monitoring is from the Highway 32 Bridge at Hamilton City upstream to Keswick Dam, approximately 103 river miles. A total of 22 tagged adult green sturgeon were in the study area in 2011. Of these, 14 passed upstream of the RBDD before the gates were lowered. Eleven of these fish passed downstream of the dam prior to the gates being lowered, and 2 successfully passed under the lowered gates: one on June 17 and one on June 21. One of these fish was last detected on June 21 by a stationary monitor located about 10 river miles upstream of the RBDD. It is possible that the battery in the acoustic tag lost power, as this fish was tagged in October 2005. Eight tagged fish did not pass upstream of the dam. One of these fish did reach the dam on May 9, remained in the area for several hours, and then moved back downstream to a known holding and spawning area approximately 8 river miles downstream of the RBDD.

A Vemco Acoustic Positioning System, and an alternative Vemco Positioning System were deployed in the Antelope Creek vicinity in order to track the fine-scale movements of tagged adult green sturgeon. In addition, 15 sites in the Sacramento River were characterized, five each of: 1) known spawning grounds, 2) confirmed sturgeon presence, but no spawning, and 3) no confirmed sturgeon presence. River discharge, flow profiles, and bathymetry were measured. The goal is to model the preferred environment for sturgeon to aggregate, and use this to predict presence at other sites.

Seven juvenile green sturgeon captured by the U.S. Fish and Wildlife Service were transferred from the Reclamation wet lab in Red Bluff to the Center for Aquatic Biology and Aquaculture (CABA) at UC Davis. The intent is to rear these fish, surgically implant acoustic tags, and track their movements to learn more about their rearing habitat. A laboratory study on the effects of acoustic tagging on juvenile green sturgeon was previously completed by UC Davis.

In preparation for spawning wild-caught green sturgeon, UC Davis has maintained and upgraded their CABA facilities. They also successfully spawned a northern distinct population segment female green sturgeon. Hatched larvae were made available for implementing the fish screen performance evaluation task.

However, because of the final Endangered Species Act section 4(d) rule prohibiting the take of green sturgeon under some circumstances, and because the green sturgeon Recovery Team has now convened, there are some differences of opinion as to whether Task 4, spawning of wild-caught green sturgeon and rearing of juveniles for

telemetric and laboratory studies, should be pursued at this time. The Science Panel is now being asked to review this task and provide recommendations, as detailed below.

Finally, larval and juvenile green and white sturgeon swimming performance and behavior has been studied in the laboratory, particularly in relation to fish screens and guidance louvers. Experiments to date have considered both species at several life-stages/sizes ranging from 8 to 30 cm.

Questions for the Independent Science Panel pertaining to the spawning of adult green sturgeon in captivity, pursuant to task 4 of Appendix 2-B of NMFS' biological opinion:

1. Are there genetic implications of spawning at least 2 female green sturgeon in captivity and eventually releasing their progeny? If so, what could they be?
2. Are there scientific implications to the green sturgeon population if 2 female green sturgeon are spawned in captivity, and the juveniles that are not used for research euthanized? If so, what could they be?
3. Considering the responses to #1 and 2, above, would there be less risk to the green sturgeon population if wild juvenile green sturgeon were captured and utilized for the studies?
4. What are some methods to capture juveniles in the wild for the studies?